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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Supplemental **Office Action Summary**	Application No. 09/944,454	Applicant(s) FUKUSHIMA ET AL.	
	Examiner Craig W. Kronenthal	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☒ Claim(s) *32 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/30/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

1. Claim 32 is objected to because of the following informalities:

   - On lines 2-3 of claim 32, "electronic watermark information detecting means" should be replaced with "electronic watermark information amount detecting means", as there is only precedence for the latter object.

Appropriate correction is required.

2. Claim 36 is objected to because of the following informalities:

   - On the last line of claim 36, "be" should be added before "perceived".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4, 5, 7, 8, 10, 11, 15, 16, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Suda (P.N. 6,639,996).

Regarding Claim 1: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Image information amount detecting means (303) for detecting an amount of information of the image data in which the electronic watermark is to be embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 9 as the arrow pointing from 303 to 304)
- Encoding information detecting means (108) for detecting encoding information from the image data in which the electronic watermark has been embedded (done by 304) and which has been encoded (done by 305),
- Said electronic watermark embedding means (304) controlling an amount of the electronic watermark data to be embedded in the image data according to the image information amount signal (Fig. 6 arrow pointing from 303 to 304) detected by said image information amount detecting means (303) and the encoding information detected by said encoding information detecting means (108)

    The electronic watermark embedding means or adder (304) as referred to by Suda uses a block selection circuit (307) and a frame counter (308) to control how many blocks will receive watermark data (col. 5 lines 59-67).

Regarding Claim 2: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Image information amount detecting means (303) for detecting an amount of information of the image data in which the electronic watermark is to be embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 6 as the arrow pointing from 303 to 304)
- Encoding information detecting means (108) for detecting encoding information from the image data in which the electronic watermark has been embedded (done by 304) and which has been encoded (done by 305),
- Said electronic watermark embedding means (304) controlling a position of the image data at which the electronic watermark data is embedded in the image data according to the image information amount signal (Fig. 6 arrow pointing from 303 to 304) detected by said image information amount detecting means (303) and the encoding information detected by said encoding information detecting means (108)

The electronic watermark embedding means or adder (304) as referred to by Suda uses a motion detection circuit (306) and a block selection circuit (307) to control which blocks the watermark will be positioned in by determining which blocks show motion (col. 5 lines 54-59).

Regarding Claim 4: Suda discloses an electronic watermark embedding apparatus according to claim 1, wherein said electronic watermark embedding means controls an amount of the electronic watermark data of a particular spatial frequency component (col. 6 lines 32-34) to be embedded in the image data according to the image information amount signal. The amount is controlled as explained above regarding claim 1.

Regarding Claim 5: Suda discloses an electronic watermark embedding apparatus according to claim 2, wherein said electronic watermark embedding means controls a position of the image data at which the electronic watermark data of a particular spatial frequency component (col. 6 lines 32-34) to be embedded in the image data according to the image information amount signal. The position is controlled as explained above regarding claim 2.

Regarding Claim 7: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data, comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Image information amount detecting means (303) for detecting an amount of information of the image data in which the electronic watermark has been embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 9 as the arrow pointing from 303 to 304)
- Encoding information detecting means (108) for detecting encoding information from the image data in which the electronic watermark has been embedded (done by 304) and which has been encoded (done by 305),
- Said electronic watermark embedding means (304) controlling an amount of the electronic watermark data to be embedded in the image data according to the image information amount signal (Fig. 6 arrow pointing from 303 to 304) detected by said image data amount detecting means (303) and the encoding information detected by said encoding information amount detecting means (108)

The electronic watermark embedding means or adder (304) as referred to by Suda uses a block selection circuit (307) and a frame counter (308) to control how many blocks will receive watermark data (col. 5 lines 59-67).

Regarding Claim 8: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Image information amount detecting means (303) for detecting an amount of information of the image data in which the electronic watermark is to be embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 6 as the arrow pointing from 303 to 304)
- Encoding information detecting means (108) for detecting encoding information from the image data in which the electronic watermark has been embedded (done by 304) and which has been encoded (done by 305),
- Said electronic watermark embedding means (304) controlling a position of the image data at which the electronic watermark data is embedded in the image data according to the image information amount signal (Fig. 6 arrow pointing from 303 to 304) and the encoding information detected by said image information amount detecting means (303)

The electronic watermark embedding means or adder (304) as referred to by Suda uses a motion detection circuit (306) and a block selection circuit

(307) to control which blocks the watermark will be positioned in by determining which blocks show motion (col. 5 lines 54-59).

Regarding Claim 10: Suda discloses an electronic watermark embedding apparatus according to claim 7, wherein said electronic watermark embedding means controls an amount of the electronic watermark data of a particular spatial frequency component (col. 6 lines 32-34) to be embedded in the image data according to the image information amount signal. The amount is controlled as explained above regarding claim 7.

Regarding Claim 11: Suda discloses an electronic watermark embedding apparatus according to claim 8, wherein said electronic watermark embedding means controls a position of the image data at which the electronic watermark data of a particular spatial frequency component (col. 6 lines 32-34) to be embedded in the image data according to the image information amount signal. The position is controlled as explained above regarding claim 8.

Regarding Claim 15: Suda discloses an electronic watermark embedding apparatus according to claim 1, wherein said electronic watermark embedding means conducts a control operation to increase the amount of the electronic watermark to be embedded in the image data within a predetermined range, when an amount of image information indicated by the image information amount signal increases (col. 5 lines 37-40). The

image data entered is divided into blocks of 8x8 pixels. The more data entered, the more blocks are created and the more watermark data must be embedded.

Regarding Claim 16: Suda discloses an electronic watermark embedding apparatus according to claim 2, wherein said electronic watermark embedding means changes, when an amount of image information indicated by the image information amount signal changes, the position of the image data at which the electronic watermark data is embedded in the image data to a position at which the electronic watermark cannot easily fade

Regarding Claim 18: Suda discloses an electronic watermark embedding apparatus according to claim 1, wherein said electronic watermark embedding means operates in cooperation with a format converting unit to convert the image data in which the electronic watermark has been embedded into data of an MPEG2 format (col. 8 lines 37-40). In Fig. 10 the embodiment Suda describes is an encoding circuit (103), which contains the electronic watermark embedding means (711, which acts as 304) and operates under the MPEG-2 standard. It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 3, 6, 9, 12, 17, 19, 20, 21, 22, 23, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suda in view of Rhoads (P.N. 5,748,763).

Regarding Claim 3: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Image information amount detecting means (303) for detecting an amount of information of the image data in which the electronic watermark is to be embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 6 as the arrow pointing from 303 to 304)

- Encoding information detecting means (108) for detecting encoding information from the image data in which the electronic watermark has been embedded (done by 304) and which has been encoded (done by 305),

Suda does not disclose the controlling of the strength of the electronic watermark data by the electronic watermark embedding means (304). However, Rhoads discloses:

- Said electronic watermark embedding means (202) controlling strength of the electronic watermark data to be embedded in the image data

  Rhoads' real time encoder, which embeds a watermark or identification data, as referred to by Rhoads, utilizes a scaler (210) to determine the strength of the watermark (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 6: Suda as modified by Rhoads discloses an electronic watermark embedding apparatus according to claim 3, wherein said electronic watermark embedding means controls strength of the electronic watermark data of a particular spatial frequency component (col. 6 lines 32-34) to be embedded in the image data

according to the image information amount signal. The strength is controlled as explained above regarding claim 3.

Regarding Claim 9: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Image information amount detecting means (303) for detecting an amount of information of the image data in which the electronic watermark is to be embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 6 as the arrow pointing from 303 to 304)
- Encoding information detecting means (108) for detecting encoding information from the image data in which the electronic watermark has been embedded (done by 304) and which has been encoded (done by 305),

Suda does not disclose the controlling of the strength of the electronic watermark data by the electronic watermark embedding means (304). However, Rhoads discloses:

- Said electronic watermark embedding means (202) controlling strength of the electronic watermark data to be embedded in the image data

Rhoads' real time encoder, which embeds a watermark or identification data, as referred to by Rhoads, utilizes a scaler (210) to determine the strength of the watermark (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 12: Suda as modified by Rhoads discloses an electronic watermark embedding apparatus according to claim 9, wherein said electronic watermark embedding means controls strength of the electronic watermark data of a particular spatial frequency component (col. 6 lines 32-34) to be embedded in the image data according to the image information amount signal. The strength is controlled as explained above regarding claim 9.

Regarding Claim 17: Suda as modified by Rhoads disclose the electronic watermark embedding apparatus according to claim 3. Rhoads further discloses said electronic watermark embedding means conducts a control operation to increase the strength of the electronic watermark to be embedded in the image data within a predetermined range when an amount of image information indicated by the image information amount

signal increases (col. 18 lines 48-53). Rhoads recognizes that different applications have different requirements and therefore explains that the second scaler (210), which provides the watermark strength, should be adjustable. It would be obvious to one skilled in the art of watermarking that the greater the amount of input information the more complex the input is and therefore the watermark would need to be stronger for better detection.

Regarding Claim 19: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data, comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (711)
- Format converting means for converting the image data into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.
- Converted image information detecting means (704) for detecting an amount of information of the image data converted by said format converting means into data of an MPEG2 format and for outputting a signal representing the converted image information. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted. The output

signal is represented in Fig. 10 by the arrow pointing from 704 to the 705 and 708.

- Said electronic watermark embedding means (711) controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof according to the converted image information signal.

  The electronic watermark embedding means or adder, (711) as referred to by Suda, uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with the amount of information of the imaged data detected by the quantization circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 20: Suda discloses a format converter for converting a format of the image data into an MPEG2 format, comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (711)
- Format converting means for converting the image data into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.
- Converted image information detecting means (704) for detecting an amount of information of the image data converted by said format converting means into data of an MPEG2 format and for outputting a signal representing the converted image information. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted. The output signal is represented in Fig. 10 by the arrow pointing from 704 to the 705 and 708.
- Said electronic watermark embedding means (711) controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof according to the converted image information signal.

  The electronic watermark embedding means or adder, (711) as referred to by Suda, uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with the amount of information of the imaged data detected by the quantization

circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 21: Suda discloses an electronic watermark embedding method of embedding an electronic watermark in the image data, comprising the steps of:

- Generating electronic watermark data of an electronic watermark to be embedded in the image data (106)
- Embedding the electronic watermark in the image data (711)
- Converting the image data in which the electronic watermark data has been embedded into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.

- Detecting an amount of information (704) of the image data converted into data of an MPEG2 format. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted.
- Controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof according to the detected amount of information of the image data.

The electronic watermark embedding means or adder, (711) as referred to by Suda, uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with the amount of information of the imaged data detected by the quantization circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 22: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data, comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (711)
- Format converting means for converting the image data into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.
- Said format converting means comprising image information amount detecting means (704) for detecting an amount of information of the image data converted into data of an MPEG2 format and for outputting an image information amount signal. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted. The output signal is represented in Fig. 10 by the arrow pointing from 704 to the 705 and 708.
- Said electronic watermark embedding means (711) controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof according to the image information amount signal.

  The electronic watermark embedding means or adder, (711) as referred to by Suda, uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with

the amount of information of the imaged data detected by the quantization circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 23: Suda discloses a format converter for converting a format of the image data into an MPEG2 format, said format operating in cooperation with:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (711)
- Format converting means for converting the image data into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.

- Said format converting means including image information detecting means (704) for detecting an amount of information of the image data converted into data of an MPEG2 format and for outputting a signal representing the detected image information amount. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted. The output signal is represented in Fig. 10 by the arrow pointing from 704 to the 705 and 708.
- An electronic watermark embedding apparatus (Fig. 1)
- Said electronic watermark embedding apparatus (Fig. 1) detecting a quantizing step for a high-frequency component of spatial frequency components of the image data according to the image information amount signal and controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof.

  The detection of a quantizing step for a high-frequency component of spatial frequency components of the image data is done within the compression encoding circuit (103) of the watermark embedding apparatus (Fig. 1) specifically by the quantization circuit (704). Furthermore, the electronic watermark embedding apparatus (Fig. 1) uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with the amount of information of the imaged data detected by the quantization circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the

watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 24: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data, comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (711)
- Format converting means for converting the image data into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.
- Said format converting means including image information detecting means (704) for detecting an amount of information of the image data converted into data of

an MPEG2 format and for outputting a signal representing the detected image information amount. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted. The output signal is represented in Fig. 10 by the arrow pointing from 704 to the 705 and 708.

- Said electronic watermark embedding means (711) detecting a quantizing step for a high-frequency component of spatial frequency components of the image data according to the image information amount signal and controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof.

  The detection of a quantizing step for a high-frequency component of spatial frequency components of the image data is done specifically by the quantization circuit (704), which works in conjunction with the embedding means (711). Furthermore, the electronic watermark embedding means (711) uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with the amount of information of the imaged data detected by the quantization circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with

the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

Regarding Claim 25: Suda discloses an electronic watermark embedding method of embedding an electronic watermark in image data, comprising the steps of:

- Generating data of an electronic watermark to be embedded in the image data (106)
- Embedding the electronic watermark in the image data (711)
- Converting the image data in which the electronic watermark has been embedded into data of an MPEG2 format (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.
- Detecting an amount of information of the image data converted into data of an MPEG2 format and for outputting a signal representing the detected image information amount. Under the MPEG2 standard the quantization circuit (704) acts to detect the amount of information of image data converted. The output signal is represented in Fig. 10 by the arrow pointing from 704 to the 705 and 708.

- Detecting a quantizing step for a high-frequency component of spatial frequency components of the image data according to the image information amount and controlling at least one of an amount of the electronic watermark data to be embedded in the image data and strength thereof according to the detecting result.

The detection of a quantizing step for a high-frequency component of spatial frequency components of the image data is done specifically by the quantization circuit (704), which works in conjunction with the embedding means (711). Furthermore, the electronic watermark embedding means (711) uses a motion compensation circuit (707) and a gate circuit (710) to control how many blocks will receive watermark data in accordance with the amount of information of the imaged data detected by the quantization circuit (704) (col. 9 lines 24-28 and 32-35). Suda's Figure 10 does not disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

7. Claims 13, 14, 26, 27, 29, 30, 32, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suda in view of Matsumura et al. (US 2001/0010707 A1). (hereinafter Matsumura)

Regarding Claim 13: Suda discloses an electronic watermark embedding apparatus according to claim 1, but does not specify the exact output of the encoding information detecting means. Matsumura however, discloses said encoding information detecting means outputting, as the encoding information, at least one of a quantizer scale code value, an MQUANT value, and a quantizer matrix value in an ISO/IEC standard 13818 (to be abbreviated as MPEG2 herebelow) (p. 3 section [0058]). It would be obvious to one skilled in the art of watermarking to modify Suda's encoding information to include Matsumura's MQUANT value for re-encoding image data with an electronic watermark to minimize deterioration of the image data.

Regarding Claim 14: Matsumura discloses said encoding information (to be referred to as y herebelow) has a relationship of y=f(x), where f represents a function, with a value (to be referred to as x herebelow) including at least one of the quantizer scale code value, the MQUANT value, and the quantizer matrix value, said relationship including a relationship of dy/dx >= 0. Matsumura explains that the parameters named above are utilized in a preprocessing portion (37) for transforming the watermarked image to a lower resolution before re-encoding (p. 6 sections [0129] and [0130]). Matsumura also shows the relationship between encoding information (Ge(n)) and the code quantity or

MQUANT value (Gd(n)) in equation 1 (p. 4 section [0073]). As shown in the equation Ge(n), f(k), and Gd(n) correspond to y, f, and x respectively. The first derivative is the slope which in this case is f(k) where k is a ratio. Furthermore, examples of f(k) are shown in [0124] - [0127] to be all positive numbers, specifically 1, 1/2, 3/4, and 2/3. It can be concluded that the slope will never be negative because it is impossible to have a negative value of pixels.

Regarding Claim 26: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Electronic watermark information amount detecting means (108) for detecting information of the electronic watermark in the image data in which the electronic watermark has been embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 1 as the arrow pointing from 108 to 109)

While Suda discloses both an embedding means (304) and a detecting means (108) as explained above, and the controlling of an amount of watermark data by the embedding means as explained in claim 1, it fails to disclose the direct use of the result of the

detector in the operation of the embedding means. However, Matsumura does disclose:

- Said electronic watermark embedding means (31) controlling an amount of the electronic watermark data to be embedded in the image data according to the detected electronic watermark information (coding information shown by arrow pointing from 11 to 50)

  The control portion (50) uses the coding information from the decoder to determine the amount of watermark data to be embedded. It would be obvious to one skilled in the art of watermarking to modify Suda with the teachings of Matsumura to allow for varying amounts of watermarking to better fit the features of specific image data and to increase the difficulty of counterfeiting. Suda makes known the importance of concealing watermarks in areas of motion. It is obvious as there are different amounts of motion, it would be beneficial to alter the amount of embedding done accordingly. Also it is well known that watermarking is used for security reasons, and different amounts of watermarking would be used for different levels of security.

Regarding Claim 27: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)

- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)
- Electronic watermark information amount detecting means (108) for detecting information of the electronic watermark in the image data in which the electronic watermark has been embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 1 as the arrow pointing from 108 to 109)

While Suda discloses both an embedding means (304) and a detecting means (108) as explained above, and the controlling of the watermark data's position by the embedding means as explained in claim 1, it fails to disclose the direct use of the result of the detector in the operation of the embedding means. However, Matsumura does disclose:

- Said electronic watermark embedding means (31) controlling a position of the electronic watermark data to be embedded in the image data according to the detected electronic watermark information (coding information shown by arrow pointing from 11 to 50)

The control portion (50) uses the coding information from the decoder to determine the amount of watermark data to be embedded. It would be obvious to one skilled in the art of watermarking to modify Suda with the teachings of Matsumura to allow for varying the position of watermarks to better fit the features of specific image data and to increase the difficulty of counterfeiting. Suda makes known the importance of concealing

watermarks in areas of motion (col. 6 lines 56-59). Also it is well known that watermarking is used for security reasons, and different areas of watermarking would yield different levels of detection and therefore used for different levels of security.

Regarding Claim 29: Suda as modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 26, wherein said electronic watermark embedding means controls an amount of the electronic watermark data of a particular spatial frequency component (Suda, col. 6 lines 32-34) to be embedded in the image data according to the electronic watermark information. The amount is controlled as explained above regarding claim 26.

Regarding Claim 30: Suda as modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 27, wherein said electronic watermark embedding means controls a position of the image data at which the electronic watermark data of a particular spatial frequency component (Suda, col. 6 lines 32-34) is embedded in the image data according to the electronic watermark information. The position is controlled as explained above regarding claim 27.

Regarding Claim 32: Suda modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 26, wherein said electronic watermark information [amount] detecting means (Suda, 108) detects information regarding the

electronic watermark in the image data in which the electronic watermark has been imbedded and for which image data compression processing is then executed according to an ISO/IEC standard 13818 (abbreviated as MPEG2) and outputs the information (col. 8 lines 37-40). The imbedding and compression is done in the compression encoding circuit (103) of Figure 10.

Regarding Claim 39: Suda also discloses said electronic watermark embedding means operating in cooperation with a format converting unit to convert the image data in which the electronic watermark has been embedded into data of an MPEG2 (col. 8 lines 37-40). It is not diagramed in Fig. 10, but it is inherent that a conversion unit or similar structure would be needed within the encoding circuit (103) to convert the data to a MPEG2 format.

8. Claims 28, 31, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suda in view of Rhoads and Matsumura.

Regarding Claim 28: Suda discloses an electronic watermark embedding apparatus for embedding an electronic watermark in image data comprising:

- Electronic watermark data generating means for generating data of an electronic watermark to be embedded in the image data (106)
- Electronic watermark embedding means for embedding the electronic watermark in the image data (304)

- Electronic watermark information amount detecting means (108) for detecting information of the electronic watermark in the image data in which the electronic watermark has been embedded and for outputting a signal representing the detected image information amount (the output signal is shown on Fig. 1 as the arrow pointing from 108 to 109)

While Suda discloses both an embedding means (304) and a detecting means (108) as explained above, it fails to disclose the direct use of the result of the detector in the operation of the embedding means. However, the combination of Matsumura and Rhoads disclose:

- Said electronic watermark embedding means (Matsumura, 31) controlling strength (Rhoads, col. 18 lines 44-48) of the electronic watermark data to be embedded in the image data according to the detected electronic watermark information (Matsumura, coding information shown by arrow pointing from 11 to 50)

  Matsumura teaches the control portion (50) which uses the coding information from the decoder to determine the characteristics of the watermark data to be embedded. One such characteristic as taught by Rhoads would be the strength of the watermark, which is set by a scaler (210). It would be obvious to one skilled in the art of watermarking to modify Suda with the teachings of Matsumura and Rhoads to create a controller acting in conjunction with the embedding means to scale the strength of the watermark thereby enabling the watermark to be decoded

and embedded with different strengths. This would allow for better customization of specific image data and counterfeit prevention. It is understood that watermarking is used for security reasons, and different watermark strengths could be used for different levels of security because they provide different levels of detection.

Regarding Claim 31: Suda as modified by Rhoads and Matsumura discloses an electronic watermark embedding apparatus according to claim 28, wherein said electronic watermark embedding means controls strength of the electronic watermark data of a particular spatial frequency component (Suda, col. 6 lines 32-34) to be embedded in the image data according to the electronic watermark information. The strength is controlled as explained above regarding claim 28.

Regarding Claim 40: Suda discloses an electronic watermark embedding method of embedding an electronic watermark in the image data, comprising the steps of:

- Providing data of an electronic watermark to be embedded in the image data (106)
- Embedding the electronic watermark in the image data (711)
- Detecting (108) information regarding the electronic watermark in the image data in which the electronic watermark has been embedded (done by 711)

While Suda discloses both an embedding means (711) and a detecting means (108) as explained above, and the controlling of an amount of watermark data by the embedding

means as explained in claim 1, it fails to disclose the direct use of the result of the detector in the operation of the embedding means. However, Matsumura does disclose:

- Controlling at least one of an amount of the electronic watermark data to be embedded (31) in the image data and strength thereof according to the information regarding the electronic watermark in the image data which is detected by the detecting step (coding information shown by arrow pointing from 11 to 50)

The control portion (50) uses the coding information from the decoder to determine the amount of watermark data to be embedded. It would be obvious to one skilled in the art of watermarking to modify Suda with the teachings of Matsumura to allow for varying amounts of watermarking to better fit the features of specific image data and to increase the difficulty of counterfeiting. Suda makes known the importance of concealing watermarks in areas of motion. It is obvious as there are different amounts of motion, it would be beneficial to alter the amount of embedding done accordingly. Also it is well known that watermarking is used for security reasons, and different amounts of watermarking would be used for different levels of security. Yet, neither Suda's Figure 10 nor Matsumura disclose the watermark embedding means to control the strength of the watermark. However, Rhoads does disclose the controlling of watermark strength through the uses of a scaler (210) (col. 18 lines 44-48). It would be obvious to one skilled in the art of watermarking to modify Suda with the scaler of Rhoads to allow the alteration of the watermark's strength to conceal the watermark in a variety of image

data. One skilled in the art of watermarking understands that different image data features such as color and motion require different watermark strengths to be visually inconspicuous.

9. Claims 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suda in view of Matsumura as applied to claim 26 above, and further in view of Florencio et al. (P.N. 6,208,745). (hereinafter Florencio)

Regarding Claim 33: Suda as modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 26, and the control of the amount of watermark information embedded, but not in response to a change in the amount of watermark information. However, Florencio discloses an electronic watermark embedding means conducting a control operation to decrease the amount of an electronic watermark to be embedded in the image data within a predetermined range indicated by the electronic watermark information increases (col. 6 lines 30-42). Florencio's compliance tester (218) could be used in conjunction with the embedding means to reduce the watermark information embedded when the amount of watermark information increases (overflow). Furthermore, the compliance tester ensures the watermark information is embedded within a predetermined range so that it complies with the MPEG standard. It would be obvious to one skilled in the art of watermarking to implement Florencio's tester with the watermark embedding apparatus of Suda and

Matsumura to trade excessive watermark protection for more practical transmission bandwidth (col. 3 lines 45-46).

Regarding Claim 34: Suda as modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 26, and the control of the amount of watermark information embedded, but not in response to a change in the amount of watermark information. However, Florencio discloses an electronic watermark embedding means conducting, when an amount of electronic watermark information indicated by the electronic watermark information decreases, a control operation to increase the amount of an electronic watermark to be embedded in the image data within a predetermined range (col. 6 lines 30-42). Florencio's compliance tester (218) could be used in conjunction with the embedding means to increase the watermark information embedded when the amount of watermark information decreases (underflow). Furthermore, the compliance tester ensures the watermark information is embedded within a predetermined range so that it complies with the MPEG standard. It would be obvious to one skilled in the art of watermarking to implement Florencio's tester with the watermark embedding apparatus of Suda and Matsumura to trade transmission bandwidth for more watermark protection (col. 3 lines 45-46).

Regarding Claim 35: Suda as modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 27, and the control of the position of watermark information embedded, but not in response to a change in the amount of

watermark information. However, Florencio discloses an electronic watermark embedding means that changes, when an amount of electronic watermark information indicated by the electronic watermark information decreases, the position of the image data at which an electronic watermark is embedded in the image data to a position at which the electronic watermark cannot easily fade. Florencio explains that the position of the watermark information is changed to compensate for a violation of the bit budget, that is the number of bits allowed within the MPEG standard, by removing data blocks (col. 7 lines 40-47). In this manner watermark information is not easily faded or lost, but instead relocated within the bitstream. It would be obvious to one skilled in the art of watermarking to modify Suda and Matsumura with Florencio's teachings to ensure the proper detection of watermark information.

Regarding Claim 36: Suda as modified by Matsumura discloses an electronic watermark embedding apparatus according to claim 27, and the control of the position of watermark information embedded, but not in response to a change in the amount of watermark information. However, Florencio discloses an electronic watermark embedding means that changes, when an amount of electronic watermark information indicated by the electronic watermark information increases, the position of the image data at which an electronic watermark is embedded in the image data to a position at which the electronic watermark cannot easily perceived. Florencio explains that the position of the watermark information is chosen to be in a "busy" region of the frame, after the number of blocks needed to contain the watermark data is determined (col. 6

lines 53-58). Florencio also accounts for the scenario when not enough blocks are available to contain watermark data so that it is not easily perceived. In this case Florencio alters the embedding means to insert the watermark information into the bitstream as added information or to substitute information within any low energy blocks. In this manner watermark information remains uneasily perceived despite increases in watermark information. It would be obvious to one skilled in the art of watermarking to modify Suda and Matsumura with Florencio's teachings to ensure the proper detection of watermark information while still protecting the image data from counterfeit attacks.

10. Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suda in view of Rhoads and Matsumura as applied to claim 28 above, and further in view of Florencio.

Regarding Claim 37: Suda in view of Rhoads and Matsumura disclose an electronic watermark embedding apparatus according to claim 28, and the control of the strength of watermark information embedded, but not in response to a change in the amount of watermark information. However, Florencio discloses an electronic watermark embedding means conducting a control operation to decrease the strength of the electronic watermark signal to be embedded in the image data within a predetermined range when an amount of electronic watermark information indicated by the electronic watermark information increases (col. 6 lines 30-42). Florencio's compliance tester

(218) could be used in conjunction with the embedding means to decrease the strength of the watermark information embedded when the amount of watermark information increases (overflow). Furthermore, the compliance tester ensures the watermark strength is within a predetermined range so that it complies with the MPEG standard. It would be obvious to one skilled in the art of watermarking to implement Florencio's tester with the watermark embedding apparatus of Suda and Matsumura to trade watermark protection for more transmission bandwidth (col. 3 lines 45-46).

Regarding Claim 38: Suda in view of Rhoads and Matsumura disclose an electronic watermark embedding apparatus according to claim 28, and the control of the strength of watermark information embedded, but not in response to a change in the amount of watermark information. However, Florencio discloses an electronic watermark embedding means conducting a control operation to increase the strength of the electronic watermark signal to be embedded in the image data within a predetermined range when an amount of electronic watermark information indicated by the electronic watermark information decreases (col. 6 lines 30-42). Florencio's compliance tester (218) could be used in conjunction with the embedding means to decrease the strength of the watermark information embedded when the amount of watermark information increases (overflow). Furthermore, the compliance tester ensures the watermark strength is within a predetermined range so that it complies with the MPEG standard. It would be obvious to one skilled in the art of watermarking to implement Florencio's

tester with the watermark embedding apparatus of Suda and Matsumura to trade transmission bandwidth for more watermark protection (col. 3 lines 45-46).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Cox et al. (PN 6,154,571) is cited for teaching the quantizing, embedding, encoding, and detecting of digital watermarks.
- Nakano et al. (PN 6,298,142) is cited for teaching an image data encoding system and apparatus involving digital watermarking.
- Inoue et al. (Pub. No. US2002/0009209 A1) is cited for teaching digital information embedding/extracting apparatus and method for execution.
- Kurowski (PN 6,553,127) is cited for teaching a method and apparatus for selective block processing.
- Fujihara et al. (PN 6,246,802) is cited for teaching an image data processor including a quantizer which restores compression encoded digital image data to spatial frequency area data.
- Tanaka (Pub. No. US 2002/0012446 A1) is cited for teaching an electronic watermark insertion device, a detecting device, and a method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig W Kronenthal whose telephone number is (703) 305-8696. The examiner can normally be reached on 8:00 am - 5:00 pm / Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 306-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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CWK
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